

APRIL/MAY 1996

# The MAILBOX<sup>®</sup>

The Idea Magazine For Teachers<sup>™</sup>

GREGORY GRAMBO

TOP SECRET CLASSIFIED  
INFORMATION-  
Activities To Introduce  
Budding Zoologists To  
Animal Classification

April/May 1996  
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and game supplement

# TOP SECRET

## Classified Information

### Activities To Introduce Budding Zoologists To Animal Classification

So many animals, so little time! How *do* scientists keep them all straight? It's no secret that they *classify*, or group, animals according to their common characteristics. Use the following activities to help your students uncover the hows and whys of animal classification.

by Gregory Grambo, Dean Medley, Kelly Medley, and Christine Thuman

### Twenty Questions


Play the familiar game Twenty Questions to demonstrate the thinking processes that take place during classification. Prior to class place a telephone book in a paper bag and hide it in a desk. When class begins, have students try to identify the book you are hiding by asking you 20 yes/no questions. Take note of the questions that your students ask. Do they inquire about color, size, number of pages, genre, or illustrations? All of these are categories by which we classify books. Afterward, point out how the types of questions students asked helped them to narrow down the possibilities. Tell students that this process is similar to what scientists go through when they are trying to *classify*, or group, a new species of animal.

### The Flip Of A Coin

Scientists use observation to classify animals. How closely do your students observe the world around them? Test their observation acumen with the following demonstration. Quiz students about an object they probably see every day—a penny. Instruct students to write down the answers to the following questions on notebook paper. Warn them not to peek at a penny while answering these questions.

- We know that Lincoln's image is on the front, or *head*, of a penny. Who is pictured on the back of a penny? (*Lincoln He can be seen sitting inside the Lincoln Memorial.*)
- What building appears on the back of a penny? (*the Lincoln Memorial in Washington, D.C.*)
- How many times does the phrase "one cent" appear on the coin? (*once, on the back*)
- Is the edge of a penny smooth or ridged? (*smooth*)
- What word appears to the left of Lincoln's head on the front of a penny? (*"Liberty"*)

Check to see how many students answered every question correctly. Point out that in order to distinguish between the thousands of species of animals, scientists must use careful, not casual, observation.



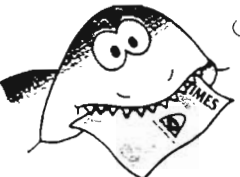
**Carl  
The  
Crocodile**  
(*Crocodylus porosus*)

Alias:  
Crocodilly  
Willy

Info: 20 feet long  
Last seen in salty waters

Case Number: 103-28A

Agent: Polly Pye-Private Eye




**Sharky**  
(*Carcharodon carcharias*)

Alias:  
Great White  
Shark, Jaws

Info: If he smiles, run!  
Case Number: 56-224-5D

Agent: Polly Pye-Private Eye




**Manty**  
(*Mantella aurantiaca*)

Alias:  
Mantella

Info: Poisonous!  
Watch out for arrows

Case #

**SECRET**



## Observe And Draw

A picture is worth a thousand words. However, drawing pictures of animals is challenging when the animals move about. Scientists have learned to capture animal images in fast, simple drawings. They add the details later, after many repeated observations. The key to making animal drawings is to observe and draw as rapidly as possible.

If you don't have plans to visit the zoo, you can bring a live animal into the classroom for observation. The animal should be one that's used to being around large numbers of children. Set up a table where four to five students can sit around the animal. Place the animal in a large, see-through cage. Have small groups of students take turns drawing the animal using pencil and paper. Encourage students to use simple lines to capture the shape and movement of the animal's spine before adding the arms, legs, head, and tail. Help students focus their attention by posing the following questions: "What lines make up the animal's form?", "Which way does it bend or twist?", and "How can you capture that twist in a few strokes?" Afterward, place several how-to-draw-animals books in a center for students who wish to practice.

# WANTED

Link The Skink  
(*Dasia smaragdina*)

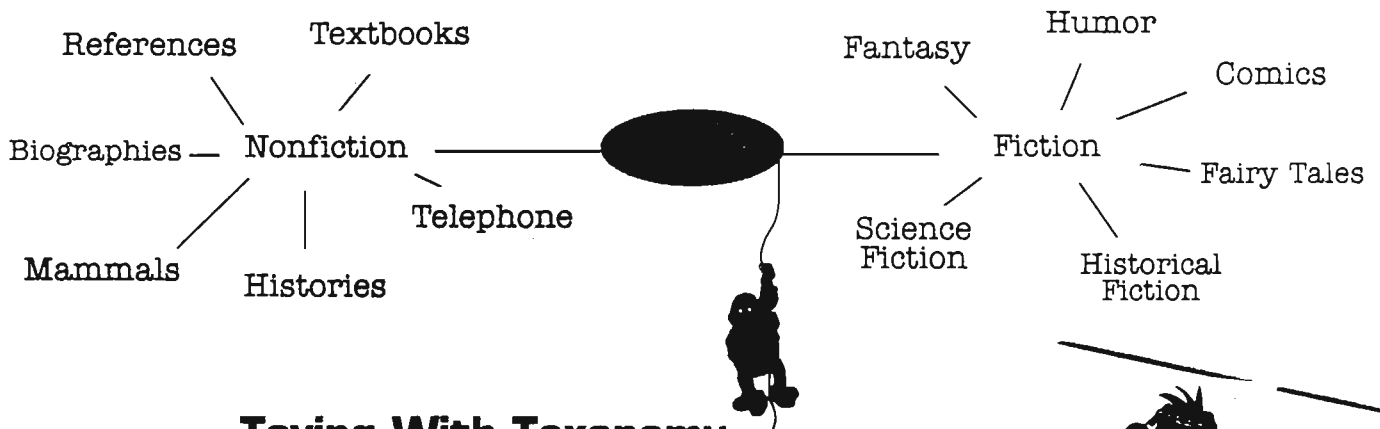


Last seen hiding among  
the leaves.

## Spinning A Web Of Classification

Brainstorm a list of items that can be classified in our world such as stores, foods, furniture, transportation, school supplies, or musical instruments. Using *books* as an example, show students how to break down a category into its smaller classifications by modeling the webbing technique. Begin by writing *books* in an oval on the chalkboard. Explain to students that books can be divided into two main categories: fiction and nonfiction. Connect two other ovals to the center. Write *fiction* in one oval and *nonfiction* in the other. Have students help you name categories that would fit in each of these two divisions. Continue expanding the web by adding additional categories. See the diagram for ideas.

Next, divide the class into teams of three to four students. Supply each team with markers and a three-foot length of light-colored bulletin-board paper. Have each team select one of the topics you brainstormed at the beginning of the lesson; then have the team make a web that divides that category into more specific groups. Afterward, have each team share its web with two other teams.



## Toying With Taxonomy

Observing and classifying is child's play when your students examine their favorite toys. Instruct each student to bring in one toy or stuffed animal. Divide the class into teams of four to five students each. Instruct each group to sit in a circle with its toys placed in the center. Direct each team member to carefully examine each toy. Then have the team categorize its toys by grouping them according to similar characteristics. Give the group a copy of "Toying With Taxonomy" (page 31). Inform students that when they group some of their toys into one category, the remaining toys must then be grouped into an opposite category. For instance, if some of the toys are grouped under the heading "contain plastic parts," the remaining toys must fit into the category "contain no plastic parts." Encourage students to devise as many specific categories as they can for their toys.

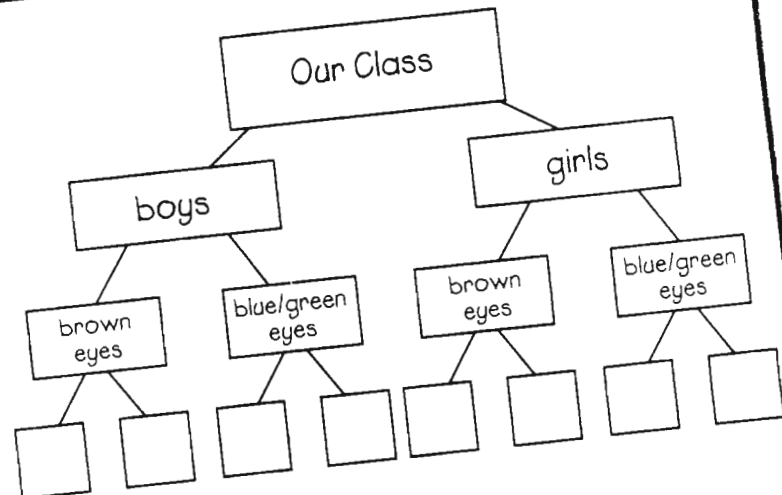
After giving them about ten minutes with the first group of toys, have teams exchange toys with another team. Instruct teams to devise different categories for grouping this new set of toys. Have teams record their findings on the "Toying With Taxonomy" sheet.



## I.D. Me!

No two people are exactly alike. Prove this statement to your students by creating a *dichotomous key* of your class. Explain that a dichotomous key allows you to make decisions between two choices until a specific organism is identified. Begin the key with the heading *Our Class* as shown in the diagram. Divide the class physically into two groups—*boys* and *girls*. Fill in the next two spaces on the key with these headings. Next divide each of these two groups further using the categories *brown eyes* and *blue/green eyes*. Record these categories on the key; then divide the students physically into these groups. Continue subdividing the class using one or more of the following categories: left-/right-handed; light/dark hair; can curl/can't curl tongue; attached/detached earlobes; can wink/can't wink one eye; can raise/can't raise one eyebrow; can touch/can't touch nose with tongue. The key is complete when each student is in an individual group by himself. Select one student and demonstrate how you can follow a pathway on the key to identify that student.

Next have students practice making their own dichotomous keys. Divide your class into groups of eight. Provide each group with a copy of "If The Shoe Fits" on page 32. Instruct groups to complete the reproducible according to the directions.



## Arthropod Animation

While most students have a clear understanding of the backboneed animals known as *vertebrates*—fish, birds, mammals, reptiles, and amphibians—they may not have extensive knowledge of the phylum of invertebrates (animals without backbones) known as *Arthropoda*. Use art to familiarize your students with a few of the millions of species in this phylum. Divide students into seven teams and give each team a copy of the "Arthropod Break-down" on page 33. Assign each team a different class of arthropods to research. Instruct each team to research the body characteristics of its particular class of arthropod. Then have each team use craft materials to construct a three-dimensional model of an arthropod in that class. Provide craft materials such as paint, pipe cleaners, Styrofoam® balls, cardboard tubes, and glue. Have each team share its completed animal and describe the animal's body characteristics.



## Classy Critters

Walk, slither, crawl, or hop on over to the pull-out centerfold in this issue and check out the game "Classy Critters." This fun gameboard, designed for two to four players, will help your students review the five classes of vertebrates.

## Literature/Software Connection

- Big Bugs;** written by Jerry Booth; Harcourt Brace & Company, 1994
- Do You Know The Difference?;** written by Andrea and Michael Bischhoff-Miersch; North-South Books Inc., 1995
- Everything You Never Learned About Birds;** written by Rebecca Rupp; Storey Communications, Inc.; 1995
- Invertebrates;** written by Bradford Burnham; Thomson Learning, 1995
- The Kingfisher First Encyclopedia Of Animals;** written by David Burnie and Linda Gamlin; Kingfisher, 1994
- Tongues And Tails;** written by Theresa Greenaway; Raintree Steck-Vaughn Publishers, 1995
- A Wasp Is Not A Bee;** written by Marilyn Singer; Henry Holt and Company, Inc.; 1995
- How We Classify Animals;** CD-Rom for Windows™ and Macintosh®; teaching module written by Helen Hansen; AIMS Media. 1995

# Toying With Taxonomy

Here's your chance to play around in the name of science! In Part I, list the toys in your group. Then carefully examine each toy for details that will help you *classify*, or group, the toys. Divide the toys into two different groups. On the first set of lines under "B. Classifications," write the names of the two groups and the number of toys in each one. Try to list four different pairs of groups on the remaining lines. Repeat these steps in Part II using another team's set of toys.



## Part I: Your Team's Toys

A. Write the name of each toy: \_\_\_\_\_  
 \_\_\_\_\_

### B. Classifications

Group A	# of toys	Group B	# of toys
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

## Part II: Another Team's Toys

A. Write the name of each toy: \_\_\_\_\_  
 \_\_\_\_\_

### B. Classifications

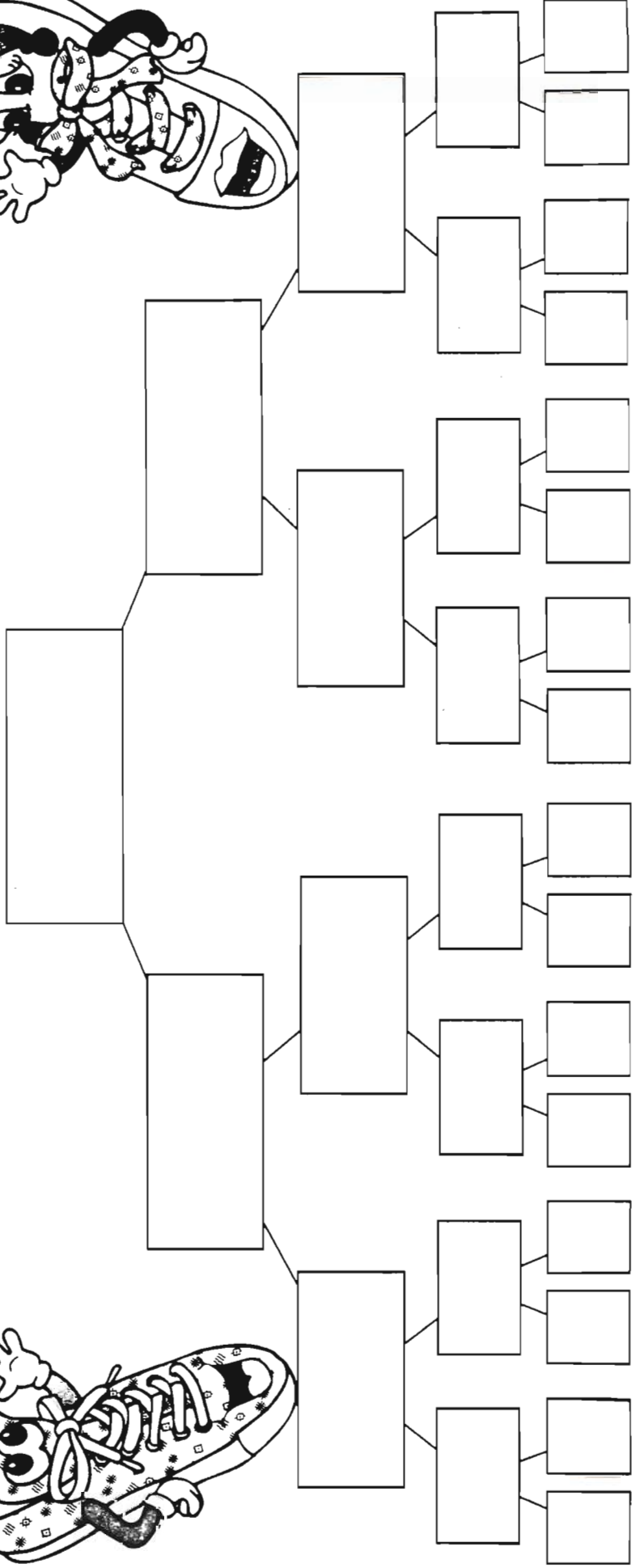
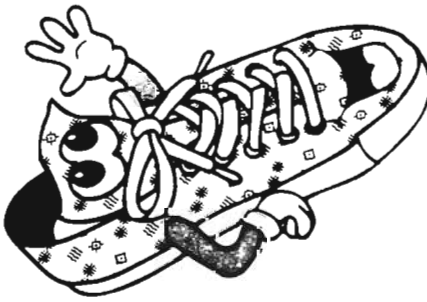
Group A	# of toys	Group B	# of toys
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

# If The Shoe Fits!

What makes your shoes unique? Find out by creating your own dichotomous key.

### Directions for a group of six to eight students:

1. Have each member of your group remove one of his shoes and place it in the center of the table.
2. Carefully examine each shoe, noting its characteristics.
3. Have a group recorder write "Group Shoes" in the top box of the dichotomous key below.
4. Brainstorm to come up with two categories into which each shoe either fits or doesn't fit. No shoe should fit into *both* categories.
5. Physically divide the shoes into your two categories. Then write the names of these two categories in the next two boxes of the key.
6. Examine the two piles of shoes. For each pile, decide on another pair of categories into which each shoe either fits or doesn't fit. Write the names of these categories in the key.
7. Divide the shoes into additional categories, recording the names of the categories on the key, until each shoe stands alone.



# CLASSY CRITTERS

## A Game To Review The Five Classes Of Vertebrates

adapted from an idea by Gregory Grambo, Richmond Hill, NY

Help students review the five classes of vertebrates with this fun, ready-to-use game for two to four players. Duplicate this page and the page of Classy Critter cards and tokens on the other side. Glue the pages on construction paper before cutting out the cards, tokens, student directions, and answer key. Store these items—along with four game markers and a die—in a large, zippered plastic bag. If desired, laminate the gameboard for durability. Clip the bag of game supplies to the gameboard with a pinch clothespin. **For more activities on animal classification, see the teaching unit on pages 28–33.**

### Directions For 2–4 Players

#### Before Playing:

1. Place your marker on one of the gameboard's vertebrates. (Two or more players may place their markers on the same vertebrate.)
2. Stack the Classy Critter cards facedown on the gameboard where indicated.
3. Stack the small tokens on each vertebrate's round space.
4. Each player rolls the die; the player with the highest roll goes first.

#### To Play:

1. In turn, roll the die and move your marker. Move in the direction indicated by the arrow nearest your marker. If two arrows are near your marker, choose one to follow.
2. Answer the question or give the word(s) that fills in the blank. Have another player check the key. If correct, stay on that space. If incorrect, move your marker back one space.
3. If you land on a "Classy Critter" space, draw a card from the stack and give the answer. Have another player check the key. If correct, move the number of spaces indicated on the card. If incorrect, move back to your original space. Return the card to the bottom of the stack.
4. If you land on one of the five vertebrates, take a token from that space. The first player to land on all five vertebrates wins the game. If time runs out, the player with the most vertebrate tokens wins.

# CLASSY CRITTERS

### Answer Key

#### Gameboard questions:

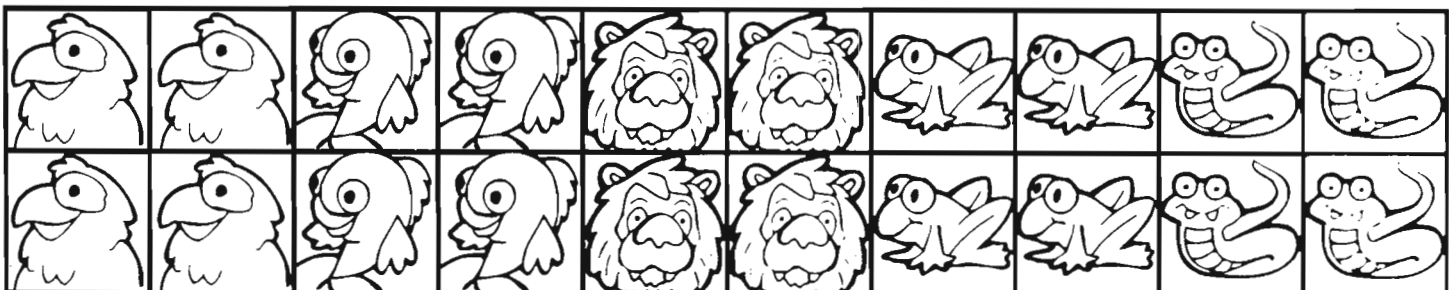
- |                              |   |
|------------------------------|---|
| 1. cold-blooded              | 11. bats  |
| 2. fish                      | 12. A jellyfish does not have a backbone.   |
| 3. fish                      | 13. mammals   |
| 4. wet                       | 14. land  |
| 5. no                        | 15. A reptile's skin is dry. An amphibian's skin is moist.  |
| 6. mammals                   | 16. the blue whale  |
| 7. They both have backbones. | 17. mammals and birds   |
| 8. reptiles                  | 18. scales  |
| 9. backbones                 | 19. water   |
| 10. ostrich                  | 20. A whale is warm-blooded. It breathes through lungs, not gills. It produces milk for nursing its young. Its body is covered with skin, not scales. |

#### Classy Critter cards:

- |                   |   |
|-------------------|---|
| a. fish           | j. orders   |
| b. Cold           | k. cold-blooded   |
| c. amphibians     | l. skin   |
| d. brains         | m. circulatory, digestive, respiratory, nervous, reproductive |
| e. 200            | n. salt water   |
| f. true           | o. oxygen   |
| g. bills or beaks | p. water  |
| h. hollow         | q. lungs  |
| i. land           | r. seven  |

## Classy Critter Cards And Tokens

<p>a. Which class of vertebrates does an ichthyologist study?</p> <p style="text-align: right;">②</p>	<p>b. _____-blooded vertebrates must avoid very high and very low temperatures.</p> <p style="text-align: right;">③</p>
<p>c. To what class do salamanders, frogs, and toads belong?</p> <p style="text-align: right;">①</p>	<p>d. Mammals have larger, more well-developed _____ than most other animals.</p> <p style="text-align: right;">②</p>
<p>e. The skeletons of all adult mammals are made of more than _____ bones.</p> <p style="text-align: right;">③</p>	<p>f. True or false: No other animals can travel faster than birds.</p> <p style="text-align: right;">①</p>
<p>g. Instead of teeth, birds have _____.</p> <p style="text-align: right;">①</p>	<p>h. A bird's skeleton is lightweight because many of its bones are _____.</p> <p style="text-align: right;">②</p>
<p>i. Do most adult amphibians live on land or in water?</p> <p style="text-align: right;">③</p>	<p>j. Each class of vertebrates can be divided into smaller groups called _____.</p> <p style="text-align: right;">②</p>
<p>k. Are most vertebrates warm-blooded or cold-blooded?</p> <p style="text-align: right;">②</p>	<p>l. Besides hair, what else covers a mammal's body?</p> <p style="text-align: right;">①</p>
<p>m. Name at least two body systems all mammals have.</p> <p style="text-align: right;">①</p>	<p>n. Do most fish live in salt water or freshwater?</p> <p style="text-align: right;">②</p>
<p>o. What do a fish's gills take from the water?</p> <p style="text-align: right;">①</p>	<p>p. The main job of a reptile's skin is to keep _____ in the animal's body.</p> <p style="text-align: right;">③</p>
<p>q. Do reptiles breathe through lungs or gills?</p> <p style="text-align: right;">②</p>	<p>r. How many bones are in most mammals' necks?</p> <p style="text-align: right;">①</p>



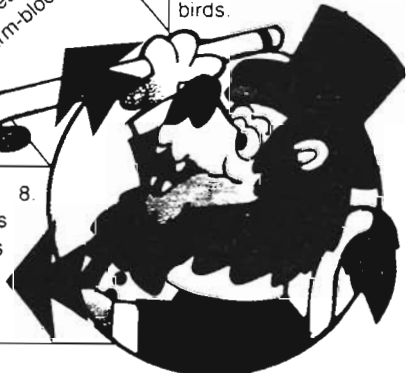


# CLASSY CRITTERS

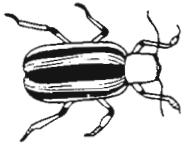
Stack Classy Critter cards here.



<p>1. Are reptiles warm- or cold-blooded?</p>	<p>2. Which vertebrates breathe through gills?</p>	<p>3. Which class has the most different species?</p>	
<p>13. Which vertebrates produce milk for their babies?</p>	<p>14. Do most reptiles live on land or in water?</p>	<p>15. How is a reptile's skin different from that of an amphibian?</p>	<p>4. Is an amphibian's skin wet or dry?</p>
<p>12. Why is a jellyfish not a fish?</p>	<p>16. Reptiles have dry skin covered with _____.</p>	<p>18. _____</p>	<p>5. Do all birds fly?</p>
<p>11. What kind of mammal can fly?</p>	<p>19. Most amphibians have to lay their eggs in _____.</p>	<p>16. What is the largest mammal that has ever lived?</p>	<p>5. Which class has body hair?</p>
<p>10. What is the largest bird in the world?</p>	<p>20. Why is a whale a mammal and not a fish?</p>	<p>17. Which two classes are warm-blooded?</p>	<p>5. Name a characteristic shared by fish and birds.</p>
<p>9. What do vertebrates have that invertebrates don't?</p>	<p>8. To what class did dinosaurs belong?</p>	<p>8. To what class did dinosaurs belong?</p>	



# Arthropod Breakdown



There are a lot of arthropods out there!  
 In fact, this phylum contains the largest variety of creatures in the animal kingdom. But as varied as they are, all arthropods do have some common characteristics including a tough exoskeleton, jointed limbs, and a nerve cord running the length of the body. Look over the chart below to learn about some of the classes contained in the phylum Arthropoda and its subphylum, Crustacea.

